IN THE SPECIFICATION

Please insert the following paragraph at page 1, between lines 3 and 6:

CROSS REFRENCE TO RELATED APPLICATIONS

This application is a divisional of application No. 10/182,395, now abandoned, the entire contents of which are hereby incorporated by reference.

Please replace the paragraph at page 2, line 13 to page 3, line 5, with the following rewritten paragraph:

Figs. 22 to 24 show a mold apparatus 51 of a projected form gate cutting system using a fixed side stamper according to the prior art, in which a cavity 54 as a circular disk form space is vertically formed between faying surfaces of a fixed die 52 and a movable die 53. A stamper 55 is vertically disposed on the fixed die 52 side of the cavity 54, and the innermost circumference of the stamper 55 is fixed to a fixed mirror surface by a mechanical clamp. A cylindrical sprue bushing 56 is horizontally disposed in the fixed die 51 at a central portion of the cavity 54, and a cylindrical projected form gate cutter (also called "punch"), a small diameter ejector pin 58 and a cylindrical ejector 59 are horizontally disposed at a position opposite to the sprue bushing 56. The ejector pin 58 is disposed at the center of the projected form gate cutter 57, and the ejector 59 is disposed at the outer circumference of the projected form gate cutter 57.

Please replace the paragraph at page 3, lines 6-18, with the following rewritten paragraph:

A sprue ~~hole~~ 60 at the center of the sprue bushing 56 to which an injection cylinder (not shown) is connected is opened at the center of a projected form gate forming recessed portion 61 formed at the tip of the sprue bushing 56, and the tip of the projected form gate

cutter 57 is formed at a projected form gate forming projected portion 62. A projected form gate 64 formed in a projected shape relative to a signal transfer side surface 63 which is a surface on the stamper 55 side of the cavity 54 is formed between the recessed portion 61 and the projected portion 62. Therefore, the projected form gate cutter 57 is a projected form gate cutter for forming the projected form gate 64.

Please replace the paragraph at page 3, line 19 to page 4, line 10, with the following rewritten paragraph:

In the mold apparatus 51 of the projected form gate system according to the prior art, a molten resin P1 consisting of a plasticized polycarbonate or other synthetic resin is injected in the direction of arrow a from the injection cylinder into the sprue ~~hole~~ 60 and is charged under pressure into the cavity 54 through the projected form gate 64, in the condition where the fixed die 52 and the movable die 53 are heated. In this case, the molten resin P1 compressed to a high pressure by the injection cylinder is pressurized onto the fine roughness surface of the stamper 55, whereby a disk substrate 73 in which signals 71 such as information signals, a tracking servo signal and the like are transferred onto a signal transfer surface 72 in the form of pits, a groove and the like is injection molded, as shown in Figs. 25 and 26. Thereafter, a center hole 74 of the disk substrate 73 is formed by punching.

Please replace the paragraph at page 4, line 24 to page 5, line 13, with the following rewritten paragraph:

Hitherto, the center hole 74 as a circular hole has been formed in the center of the disk substrate 73 by punching (called "gate cutting"), by a method in which the projected form gate cutter 57 is projected in the direction of arrow b from a retracted position shown in Fig. 23 to an advanced position shown in Fig. 24 so as to cut the incompletely solidified resin

between an outer circumferential surface 62a of the projected portion 62 of the projected form gate cutter 57 and an inner circumferential surface 61a of the recessed portion 61 of the sprue bushing 56. At this time, a roughly T-shaped sprue and gate remaining resin 73a remaining in the sprue ~~hole~~ 60 and the projected form gate 64 is ejected in the direction of arrow b from the signal transfer surface 72 of the disk substrate 73 toward the fixed die 52 side.

Please replace the paragraph at page 6, line 12 to page 7, line 4, with the following rewritten paragraph:

However, when the center hole 74 is punched between the projected portion 62 of the projected form gate 57 and the recessed portion 61 of the sprue bushing 56 at the timing before solidification of the molten resin P1 which is within 2 sec after the injection molding of the molten resin P1, the resin P1 before solidification would fly into the clearance between the outer circumferential surface 62a of the projected portion 62 and the inner circumferential surface 61a of the recessed portion 61, so that a flash 75 in the shape of projecting to the outside from the edge on the signal transfer surface 72 side of the center hole 74 is necessarily generated, as shown in Fig. 25. The height H1 of the flash 75 varies according to the molding conditions (the temperature of the resin P2 in the gate, and the like) of the clearance between the recessed portion 61 and the projected portion 62 shown in Figs. 22 and 23; hitherto, the height H1 has been several tens of μm to as large as 100 μm.

Please replace the paragraph at page 15, line 24 to page 16, line 12, with the following rewritten paragraph:

A mold apparatus for injection molding a disk substrate according to the present invention for attaining the above object is a mold apparatus for injection molding a disk

substrate including a cavity into which a molten resin is injected through a sprue and a ~~recessed form~~ gate, and a signal transfer stamper disposed on a fixed die side of the cavity, wherein the mold apparatus includes a ~~recessed form~~ gate forming projected portion provided at the tip of the sprue bushing, a ~~recessed form~~ gate forming recessed portion provided oppositely to the projected portion at the tip of a ~~recessed form~~ gate cutter disposed on the side of a movable die, and a center hole molding portion provided at the outer circumference of the sprue.

Please replace the paragraph at page 17, lines 6-9, with the following rewritten paragraph:

The advance amount of the ~~recessed form~~ gate cutter is not less than the thickness of the ~~recessed form~~ gate and is not more than the ~~recessed form~~ gate thickness plus 0.5 mm.

Please replace the paragraph at page 17, lines 10-13, with the following rewritten paragraph:

The position of cutting the ~~recessed form~~ gate by the ~~recessed form~~ gate cutter is set at a position equal to the hole diameter of the straight portion of the center hole.

Please replace the paragraph at page 17, lines 14-19, with the following rewritten paragraph:

The ~~recessed form~~ gate cutter includes, at the tip of an outer circumferential portion of the recessed portion, a second R surface molding portion or a second C surface molding portion for molding a second R surface or a second C surface at the edge on the side opposite to the signal transfer surface side of the center hole.

Please replace the paragraph at page 17, lines 20-25, with the following rewritten paragraph:

The position of cutting the ~~recessed form~~ gate by the ~~recessed form~~ gate cutter is set at a first position equal to the hole diameter of the straight portion of the center hole and at a second position located on the inside of the first position and smaller in diameter than the first position.

Please replace the paragraph at page 18, lines 1-17, with the following rewritten paragraph:

A disk substrate taking-out apparatus according to the present invention for attaining the above object includes: a mold apparatus including a cavity formed between a fixed die and a movable die, a signal transfer stamper disposed on the fixed die side of the cavity, and a ~~recessed form~~ gate cutter disposed on the movable die side, wherein a molten resin is injected into the cavity through a sprue and a ~~recessed form~~ gate to injection molding a disk substrate, and gate cutting is conducted from the movable die side by the ~~recessed form~~ gate cutter; and a robot for detaching from the movable die the disk substrate stripped from the fixed die together with the movable die by the opening of the movable die after injection molding, the robot including a means for discharging a sprue and gate remaining resin to the movable die side relative to the disk substrate at the time of holding the disk substrate.

Please replace the paragraph at page 19, line 18 to page 20, line 13, with the following rewritten paragraph:

The injection molding apparatus according to the present invention, constituted as described above, is the mold apparatus for molding a disk substrate, including the cavity into which a molten resin is injected through the sprue and the ~~recessed form~~ gate, and the signal

transfer stamper disposed on the fixed die side of the cavity, and having a ~~recessed form~~ gate cutting structure including the ~~recessed form~~ gate forming projected portion provided at the tip of the sprue bushing, the ~~recessed form~~ gate forming recessed portion provided oppositely to the projected portion at the tip of the ~~recessed form~~ gate cutter disposed on the movable die side, and the center hole molding portion provided at the outer circumference of the sprue bushing. Therefore, at the time of injection molding of the disk substrate, the center hole is simultaneously injection molded by the center hole molding portion. Thus, even when gate cutting is conducted by advancing the ~~recessed form~~ gate cutter with a recessed form tip from the movable die side, it is possible to produce a center hole with both edges free of flash.

Please replace the paragraph at page 21, lines 11-15, with the following rewritten paragraph:

In addition, the advance amount of the ~~recessed form~~ gate cutter can be set to be equal to or more than the thickness of the ~~recessed form~~ gate and equal to or less than the ~~recessed form~~ gate thickness plus 0.5 mm. Therefore, the gate cutting can be securely performed.

Please replace the paragraph at page 21, lines 16-22, with the following rewritten paragraph:

Besides, the position of cutting the ~~recessed form~~ gate by the ~~recessed form~~ gate cutter is set at a position equal to the hole diameter of the straight portion of the center hole of the disk substrate. Therefore, at the time of cutting the ~~recessed form~~ gate, flash or the like is not generated in the straight portion of the center hole of the disk substrate.

Please replace the paragraph at page 21, line 23 to page 22, line 8, with the following rewritten paragraph:

In addition, the ~~recessed-form~~ gate cutter is provided with the second R surface molding portion or the second C surface molding portion for molding the second R surface or the second C surface at the edge on the opposite side of the signal transfer surface of the center hole, at the tip of the outer circumferential portion of the ~~recessed-form~~ gate forming recessed portion. Therefore, the second R surface or the second C surface can be molded at the edge on the opposite side of the signal transfer surface of the center hole of the disk substrate.

Please replace the paragraph at page 22, lines 9-17, with the following rewritten paragraph:

Besides, the position of cutting the ~~recessed-form~~ gate by the ~~recessed-form~~ gate cutter is set at the first position equal to the hole diameter of the straight portion of the center hole of the disk substrate and at the second position located on the inside of the first position and smaller in diameter than the first position. Therefore, the outermost diameter of the sprue and gate remaining resin cut by the ~~recessed-form~~ gate cutter can be made smaller than the inside diameter of the sprue bushing.

Please replace the paragraph at page 22, line 18 to page 23, line 5, with the following rewritten paragraph:

In addition, the disk substrate taking-out apparatus according to the present invention, constituted as described above, is so constructed that gate cutting is conducted by the ~~recessed-form~~ gate cutter from the movable die side, and the robot for taking out from the movable die the disk substrate stripped from the fixed die together with the movable die by

the opening of the movable die after injection molding is provided with the means for discharging the sprue and gate remaining resin to the movable die side relative to the disk substrate. Therefore, it is possible to provide a disk substrate taking-out apparatus optimum for application to the mold apparatus of the ~~recessed form~~ gate cutting structure.

Please replace the paragraph at page 23, lines 18-21, with the following rewritten paragraph:

Fig. 3 is an enlarged sectional view of portion A of Fig. 5 which is a part of a ~~recessed form~~ gate portion of a mold apparatus according to First Embodiment of the present invention.

Please replace the paragraph at page 23, lines 22-23, with the following rewritten paragraph:

Fig. 4 is a sectional view illustrating the cutting of a ~~recessed form~~ gate of Fig. 3.

Please replace the paragraph at page 23, line 24 to page 24, line 1, with the following rewritten paragraph:

Fig. 5 is a sectional view of the entire part of the ~~recessed form~~ gate portion of the mold apparatus according to First Embodiment of the present invention.

Please replace the paragraph at page 24, lines 2-5, with the following rewritten paragraph:

Fig. 6 is a sectional view illustrating the entire part of the mold apparatus of a fixed-side stamper and ~~recessed form~~ gate cutting system according to First Embodiment of the present invention.

Please replace the paragraph at page 24, lines 9-10, with the following rewritten paragraph:

Fig. 8 is a sectional view illustrating the cutting of the ~~recessed form~~ gate of the mold apparatus of Fig. 7.

Please replace the paragraph at page 25, lines 5-6, with the following rewritten paragraph:

Fig. 15 is a sectional view illustrating the cutting of a ~~recessed form~~ gate of Fig. 14.

Please replace the paragraph at page 25, lines 10-11, with the following rewritten paragraph:

Fig. 17 is a sectional view illustrating the cutting of a ~~recessed form~~ gate of Fig. 16.

Please replace the paragraph at page 25, lines 15-16, with the following rewritten paragraph:

Fig. 19 is a sectional view illustrating the cutting of a ~~recessed form~~ gate of Fig. 18.

Please replace the paragraph at page 25, lines 20-21, with the following rewritten paragraph:

Fig. 21 is a sectional view illustrating the cutting of a ~~recessed form~~ gate of Fig. 20.

Please replace the paragraph at page 25, line 25 to page 26, line 1, with the following rewritten paragraph:

Fig. 23 is an enlarged sectional view of a ~~recessed form~~ gate of the mold apparatus of Fig. 22.

Please replace the paragraph at page 30, line 7 to page 31, line 1, with the following rewritten paragraph:

Next, referring to Figs. 3 to 10, First Embodiment of the mold apparatus 1 optimum for injection molding the above-described disk substrate 23 will be described. The mold apparatus 1 is a mold apparatus 1 of a ~~recessed form~~ gate cutting system using a fixed-side stamper, in which a cavity 4 as a circular disk form space is vertically formed between faying surfaces of a fixed die 2 and a movable die 3. A stamper 5 is vertically disposed on the fixed die 2 side of the cavity 4, and the innermost circumference of the stamper 5 is fixed to a fixed mirror surface by a mechanical clamp. A cylindrical sprue bushing 6 is horizontally disposed in the fixed die 1 at a central portion of the cavity 4, and a cylindrical ~~recessed form~~ gate cutter (called also "punch") 7, a small-diameter ejector pin 8 and a cylindrical ejector 9 are horizontally disposed at positions opposite to the sprue bushing 6. The ejector pin 8 is disposed at the center of the ~~recessed form~~ gate cutter 7, and the ejector 9 is disposed at the outer circumference of the ~~recessed form~~ gate cutter 7.

Please replace the paragraph at page 31, lines 2-22, with the following rewritten paragraph:

A sprue ~~hole~~ 10 is formed at the center of the sprue bushing 6 to which an injection cylinder (not shown) is connected, and a ~~recessed form~~ gate forming projected portion 11 is formed at the tip of the sprue bushing 6. A ~~recessed form~~ gate forming recessed portion 12 is

formed at the tip of the ~~recessed form~~ gate cutter 7, a ~~recessed form~~ gate 14 is formed between the ~~recessed form~~ gate forming projected portion 11 and the ~~recessed form~~ gate forming recessed portion 12, and the ~~recessed form~~ gate 14 is formed in a recessed form relative to the signal transfer surface 13 which is a surface on the side of the stamper 5. Therefore, the ~~recessed form~~ gate cutter 7 is a gate cutter having a recessed type shape for forming the ~~recessed form~~ gate 14. The thickness W of the ~~recessed form~~ gate 14 is 0.3 mm, and the projection amount P1 of the ~~recessed form~~ gate cutter 7 is 0.4 mm. The bite-in amount (overlap amount) P2 of the tip 7a of an outer circumferential portion of the ~~recessed form~~ gate 7 relative to the sprue bushing 6 at the time of cutting the ~~recessed form~~ gate, described later, is set to be about 0.1 mm.

Please replace the paragraph at page 31, line 23 to page 32, line 2, with the following rewritten paragraph:

A center hole molding portion 15 for injection molding the center hole 24 of the disk substrate 23 shown in Figs. 1 and 2 is provided at the outer circumference of the ~~recessed form~~ gate forming projected portion 11 of the mold apparatus 1.

Please replace the paragraph at page 32, lines 3-9, with the following rewritten paragraph:

Namely, as shown in Figs. 3 to 5, a straight molding portion 16 for molding the center hole 24a, a taper molding portion 17 for molding the tapered portion 24b, and a first R surface (or first C surface) molding portion 18 for molding the first R surface (or first C surface) 24c are provided at the outer circumference of the ~~recessed form~~ gate forming projected portion 11.

Please replace the paragraph at page 32, lines 10-14, with the following rewritten paragraph:

As shown in Fig. 8, an auxiliary ejector pin 19 with a projection amount of about 0.2 mm is auxiliarily assembled at the outer circumference of the tip of the sprue bushing 6 of the fixed die 2. The auxiliary ejector pin 19 is advanced by fixed air.

Please replace the paragraph at page 32, line 15 to page 33, line 9, with the following rewritten paragraph:

Next, injection molding of the disk substrate 3 by the mold apparatus 1 of the ~~recessed form~~ gate system will be described. First, as shown in Figs. 3 to 7, in the condition where the fixed die 2 and the movable die 3 are heated, a plasticized molten resin P1 constituted of polycarbonate or other synthetic resin is injected from the injection cylinder into the sprue ~~hole~~ 10 in the direction of arrow a, and is charged under pressure into the cavity 4 through the ~~recessed form~~ gate 14. In this case, during or after the charging of the molten resin P1, the movable die 3 is pressed at a high pressure to the side of the fixed die 2 by a pressure cylinder disposed on the back side of the movable die 3. The molten resin P1 compressed at a high pressure in the cavity 4 is pressed against a fine roughness surface of the stamper 5, to thereby injection mold the disk substrate 23 wherein the signals 2 such as information signals and a tracking servo signal have been transferred to the signal transfer surface 22 in the form of pits, a groove and the like, as shown in Figs. 1 and 2.

Please replace the paragraph at page 33, lines 10-18, with the following rewritten paragraph:

Besides, at the time of injection molding the disk substrate 23, the straight portion 24a, the tapered portion 24a and the first R surface (or first C surface) 24c of the center hole

24 are simultaneously molded by the straight molding portion 16, the taper molding portion 17 and the first R surface (or first C surface) molding portion 18 in the center hole molding portion 15 at the outer circumference of the ~~recessed form~~ gate forming projected portion 11.

Please replace the paragraph at page 33, line 19 to page 34, line 3, with the following rewritten paragraph:

Next, as shown in Figs. 4 and 8, the ~~recessed form~~ gate cutter 7 is advanced (projected) in the direction of b by the projection amount P1 of 0.4 mm shown in Fig. 3, whereby gate cutting by 0.3 mm is performed between the inner circumferential surface 7b of the tip of the outer circumferential portion 7a of the ~~recessed form~~ gate 14 of the ~~recessed form~~ gate cutter 7 and the straight molding portion 16 which is the outer circumferential surface of the ~~recessed form~~ gate forming projected portion 11 of the sprue bushing 6.

Please replace the paragraph at page 34, lines 4-25, with the following rewritten paragraph:

Then, after the fixed die 2 and the movable die 3 are cooled for about 10 sec, the pressure of the injection cylinder is lowered; then, as shown in Fig. 9, air is blown from an outer circumferential portion of the sprue bushing 6 of the fixed die 2 in the direction of arrow a, and the auxiliary ejector pin 19 is auxiliarily projected in the direction of arrow a, whereby the movable die 3 is sufficiently opened in the direction of arrow a. By this, the injection-molded disk substrate 23 in the condition of being sucked onto the movable die 3 is pulled away from the stamper 5 of the fixed die 2 in the direction of arrow a, and a sprue and gate remaining resin 23a which has been remaining in the sprue ~~hole~~ 10 and the ~~recessed form~~ gate 14 is also pulled away from the sprue bushing 6 in the direction of arrow a. Thereafter, as shown in Fig. 10, the ejector 9 of the movable die 3 is advanced in the

direction of arrow b, whereby the injection-molded disk substrate 23 is stripped from a movable mirror surface of the movable die 3 in the direction of arrow b. Simultaneously, the sprue and gate remaining resin 23a is also stripped in the direction of arrow b by the ejector pin 8.

Please replace the paragraph at page 35, lines 13-19, with the following rewritten paragraph:

First, when injection molding is conducted by the mold apparatus 1 of the ~~recessed form~~ gate system described above and the movable die 3 is opened as shown in Fig. 10, the sprue and gate remaining resin 23a is projected from the center hole 24 of the disk substrate 23 to the side of the surface 25 opposite to the signal transfer surface 22.

Please replace the paragraph at page 39, line 21 to page 40, line 3, with the following rewritten paragraph:

Next, referring to Figs. 14 and 15, Second Embodiment of the mold apparatus 1 will be described. In this case, a second R surface molding portion (or a second C surface molding portion) 20 is provided at a corner portion on the inner circumference side of the tip surface of an outer circumferential portion 7a of the ~~recessed form~~ gate forming recessed portion 12 of the ~~recessed form~~ gate cutter 7.

Please replace the paragraph at page 40, lines 4-16, with the following rewritten paragraph:

As shown in Fig. 14, a molten resin P1 is injected into the cavity 4 through the ~~recessed form~~ gate 14, thereby molding the disk substrate 23. At a time point when the molten resin P1 is solidified to a certain extent (a time point when the disk substrate 23 can

be compressed), the ~~recessed form~~ gate cutter 7 is advanced in the direction of arrow b to perform gate cutting by 0.3 mm, as shown in Fig. 15. At the time of the gate cutting, a second R surface (or a second C surface) 24d can be molded at an edge portion on the side opposite to the signal transfer surface 13 side of the center hole 24 of the disk substrate 23 by the second R surface molding portion (or the second C surface molding portion) 20.

Please replace the paragraph at page 40, line 19 to page 41, line 16, with the following rewritten paragraph:

Next, referring to Figs. 16 and 17, Third Embodiment of the mold apparatus 1 will be described. In this case, the cutting position is provided at two inner and outer positions, namely, a first cutting position C1 for cutting by an outer circumferential surface 7c of an outer circumferential portion 7a of the ~~recessed form~~ gate forming recessed portion 12 of the ~~recessed form~~ gate cutter 7 and the straight molding portion 16 which is the outer circumferential surface of the ~~recessed form~~ gate forming projected portion 11 of the sprue bushing 6, and a second cutting position C2 for cutting by an inner circumferential surface 7b of the outer circumferential portion 7a of the ~~recessed form~~ gate forming recessed portion 12 and an inner circumferential surface 11b of a cutout portion 11a formed annularly at an outer circumferential portion of the tip of the ~~recessed form~~ gate forming projected portion 11. The inside diameter $\phi 1$ at the first cutting position C1 is equal to the inside diameter $\phi 1$ of the straight portion 24a of the center hole 24 of the disk substrate 23, and the inside diameter $\phi 3$ at the second cutting position C2 is smaller than the first inside diameter $\phi 1$ ($\phi 1 > \phi 3$), with concentric relationship therebetween.

Please replace the paragraph at page 41, line 17 to page 42, line 11, with the following rewritten paragraph:

In this case, as shown in Fig. 16, a molten resin P1 is injected into the cavity 4 through the ~~recessed form~~ gate 14, thereby injection molding the disk substrate 23. At a time point when the molten resin P1 is solidified to a certain extent (a time point when the disk substrate 23 can be compressed), the ~~recessed form~~ gate cutter 7 is advanced in the direction of arrow b to perform gate cutting. At the time of the gate cutting, the first cutting position C1 of the disk substrate 23 is cut between the outer circumferential surface 7c of the tip portion 7a of the ~~recessed form~~ gate cutter 7 and the straight molding portion 16 of the center hole molding portion, and the second cutting position C2 of the disk substrate 23 is cut between the inner circumferential surface 7b of the tip portion 7a of the ~~recessed form~~ gate cutter 7 and the inner circumferential surface 11b of the cutout portion 11a of the ~~recessed form~~ gate forming portion 11. Thus, the gate cutting is conducted simultaneously at the two inner and outer cutting positions.

Please replace the paragraph at page 43, lines 5-14, with the following rewritten paragraph:

Next, referring to Figs. 18 and 19, Fourth Embodiment of the molding apparatus 1 will be described. In this case, the diameter of the outer circumferential surface 7c of the tip portion 7a of the ~~recessed form~~ gate cutter 7 in Third Embodiment shown in Figs. 16 and 17 is set to be sufficiently larger than the diameter of the straight molding portion 16 of the center hole molding portion 15, whereby a sufficiently large step H is formed between the outer circumferential surface 7c and the straight molding portion 16.

Please replace the paragraph at page 43, lines 15-21, with the following rewritten paragraph:

Therefore, in this case, as shown in Fig. 18, the opening factor of a connecting portion 14a between the outer circumferential portion of the ~~recessed form~~ gate 14 and the cavity 4 can be set to be large, so that the molten resin P1 can flow smoothly from the inside of the recessed gate 14 into the cavity 4, and moldability of the disk substrate 23 can be enhanced.

Please replace the paragraph at page 43, line 24 to page 44, line 6, with the following rewritten paragraph:

Next, referring to Figs. 20 and 21, Fifth Embodiment of the molding apparatus 1 will be described. In this case, a second R surface molding portion (or second C surface molding portion) 20 is provided at a corner portion on the outer circumference side of a tip surface of the tip portion 7a of the ~~recessed form~~ gate forming recessed portion 12 of the ~~recessed form~~ gate cutter 7 in Fourth Embodiment shown in Figs. 18 and 19.

Please replace the paragraph at page 44, lines 7-19, with the following rewritten paragraph:

As shown in Fig. 20, a molten resin P1 is injected into the cavity 4 through the ~~recessed form~~ gate 14, thereby molding the disk substrate 23. At a time point when the molten resin P1 is solidified to a certain extent (a time point when the disk substrate 23 can be compressed), the ~~recessed form~~ gate cutter 7 is advanced in the direction of arrow b to perform gate cutting, as shown in Fig. 21. At the time of the gate cutting, a second R surface (or second C surface) 24d can be molded at an edge portion on the side opposite to the signal transfer surface 13 side of the center hole 24 of the disk substrate 23 by the second R surface molding portion (or second C surface molding portion) 20.

Please replace the paragraph at page 46, line 10 to page 47, line 10, with the following rewritten paragraph:

The injection molding apparatus according to the present invention includes a stamper disposed on a fixed die side of a cavity, a ~~recessed form~~ gate forming projected portion provided at the outer circumference of the tip of a sprue bushing, a ~~recessed form~~ gate forming recessed portion provided at the tip of a ~~recessed form~~ gate cutter disposed on a movable die side, and a center hole molding portion provided at the ~~recessed form~~ gate forming projected portion, and adopts a ~~recessed form~~ gate cutting structure relative to a signal transfer surface of a disk substrate injection molded in the cavity. Therefore, when the disk substrate is injection molded, a center hole is simultaneously injection molded by the center hole molding portion. Thus, when the ~~recessed form~~ gate cutter whose tip is recessed in shape is advanced from the movable die side to perform gate cutting, a center hole free of flash at both end edges can be produced. Accordingly, by adopting the fixed-side stamper in the same manner as in the prior art, the disk substrate free of flash at the center hole can be injection molded while preventing deformation of pits and a groove. Since the center hole molding portion is disposed on the fixed stamper side, the eccentricity amount of the groove relative to the center hole can be suppressed to be small, and reading of a tracking servo signal and the like can be performed with high accuracy.

Please replace the paragraph at page 48, lines 8-12, with the following rewritten paragraph:

In addition, the advance amount of the gate cutter is set to equal to or more than the gate thickness, and, desirably, set to be equal to or less than the gate thickness plus 0.5 mm, whereby ~~recessed form~~ gate cutting can be securely performed.

Please replace the paragraph at page 48, lines 13-17, with the following rewritten paragraph:

Besides, the position of cutting the ~~recessed form~~ gate by the ~~recessed form~~ gate cutter is set at a hole diameter position of the straight portion of the center hole, so that flash or the like is not generated in the straight portion.

Please replace the paragraph at page 48, line 18 to page 49, line 2, with the following rewritten paragraph:

The second R surface molding portion or second C surface molding portion for molding the second R surface or second C surface at the edge on the side opposite to the signal transfer surface side of the center hole is provided at the tip of an outer circumferential portion of the ~~recessed form~~ gate forming recessed portion of the ~~recessed form~~ gate cutter. Therefore, the edge on the side opposite to the signal transfer surface side of the center hole of the disk substrate can be molded with the second R surface or second C surface.

Please replace the paragraph at page 49, lines 3-19, with the following rewritten paragraph:

Besides, the position of cutting the ~~recessed form~~ gate by the ~~recessed form~~ gate cutter is set at two inner and outer positions, namely, a first cutting position set at a hole diameter position of the straight portion of the center hole, and at a second cutting position located on the inside of the first cutting position and smaller in diameter than the first cutting position. Therefore, the maximum outside diameter of a sprue and gate remaining resin after gate cutting of the molded disk substrate can be made sufficiently smaller than the inside diameter of the straight portion of the center hole; accordingly, at the time of chucking the

disk substrate by a robot and transferring the disk substrate onto an aligning machine, the sprue and gate remaining resin can easily be discharged to any of one side and the other side of the disk substrate by passing it through the center hole of the disk substrate.

Please replace the paragraph at page 49, line 20 to page 50, line 12, with the following rewritten paragraph:

The disk substrate taking-out apparatus according to the present invention is so constructed that gate cutting is conducted from a movable die side by a ~~recessed form~~ gate cutter, and a robot for taking out from the movable die the disk substrate released from the fixed die together with the movable die by the opening of the movable die after injection molding is provided with a means for discharging a sprue and gate remaining resin to the movable die side relative to the disk substrate. Therefore, even though the sprue and gate remaining resin is projected to the side of a surface opposite to the signal transfer surface of the disk substrate which is reverse to that in the prior art, the sprue and gate remaining resin can be easily discharged from the inside of the center hole. Accordingly, a disk substrate taking-out apparatus optimum for application to the mold apparatus of the ~~recessed form~~ gate cutting structure can be provided.